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**AMENDMENTS TO THE SPECIFICATION:**

Kindly replace paragraph [0015] with the following amended paragraph:

[0015] During a short-circuit between power supply sources or batteries, current flows from battery B2 (2) at a higher voltage level to battery B1 (1) through the path of the short-circuit. The resistance of the cables involved is usually between 50 mOhm and 300mOhm, so that the currents may range between 480 A and 80 A (being possible even lower currents, depending on the physical elements involved in parallel). This overcurrent can blow some of the fuses, so that it is possible that the short-circuit then disappears or that it may burn the cables or even ~~that it~~ may cause the explosion of the lower-voltage-level battery B1 (1).

Kindly replace paragraph [0016] with the following amended paragraph:

[0016] The required steps of identification of a short-circuit avoiding confusion with an overcurrent of another nature, according to the invention, are the following: 1) alarm derived from the state of the converter DC/DC (4); 2) constant sensing of the voltage at posts of the lower-voltage-level battery B1 (1); 3) changes of current in the lower-voltage-level battery B1 (1).

Kindly replace paragraph [0018] with the following amended paragraph:

[0018] According to the typical structure and functionality, a converter DC/DC (4) stops the conversion process in case voltage at the imput and the output therof are outside a certain, pre-set range. The converter constantly detects (by means of analog wiring during at least 2 ms) for the voltage at the input to be in the range of 30 to 58 V (specification for the voltage of the 42V power source) and that the output is between 9 V and 21 V (suggested voltage for the specification of the 14 V power source). A module SMM microcontroller (6) in charge of short-circuits monitoring, preferably associated to a battery B1 (1) at the lower voltage level, will be advantageously informed by a direct connection (in order to avoid delays derived from a shared communications network)

about said abnormal situation. A specific voltage detector for the power supply source B2 (2) at the higher voltage level is not considered necessary due to the sue of said feature of the converter DC/DC (4).

Kindly replace paragraph [0019] with the following amended paragraph:

[0019] Once by means of the information given by the converter DC/DC (4), it is known that an alteration in the voltage values in both power supply sources has occurred, sensing of a redundant voltage, as close as possible to the power supply source B1 (1) at the lower voltage level, during a specified time that clearly identifies a constant overcurrent situation, is proposed. Knowledge of the loads is necessary to determine this time (a time of around 1 ms is suggested). Said module SMM microcontroller (6) will check this information and complete the short-circuit sensing process.

Kindly replace paragraph [0020] with the following amended paragraph:

[0020] If the converter DC/DC (4) is disconnected, it is not possible that charging from the power supply source or battery B1 (1) at low voltage level occurs. Therefore, if said module SMM microcontroller (6) senses a change of current in the load of said power supply source B1 (1) this is a clear indication that a short-circuit has been established (the accuracy in the sensing of this current is not important since it is enough to verify that a certain degree of current charging the source exists.

Kindly replace paragraph [0021] with the following amended paragraph:

[0021] If all of the above conditions have been sensed by the module SMM microcontroller (6) then it is proceeded to inform the microcontrollers (10a, 20a, 30a) of the different power distribution units (10, 20, 30) of the architecture about it (by means of e.g. sending a priority interruption) so that they perform a short-circuit protection that essentially will comprise disconnecting the power loads and/or an inspection thereof disconnecting those that show anomalies, and eventually disconnecting battery B2 (2) at the higher voltage level, and even battery B1 (1).

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Kindly replace paragraph [0022] with the following amended paragraph:

[0022] The invention will be described below as ~~well as diverse variants of the referred~~ a short-circuit protection process and method therefor, with greater detail, with reference to illustrative drawings ~~illustrative of a way of implementing it~~, provided by way of example only.

Kindly replace paragraph [0023] with the following amended paragraph:

[0023] Fig. 1 is a schematic diagram ~~of the operative principles proposed by the invention,~~ showing ~~in addition those~~ basic parts of the system and method, i.e. the converter DC/DC, batteries B1, B2, generator G, short-circuit monitoring module SMM microcontroller, power distribution units PDU, and communications network N.

Kindly replace paragraph [0024] with the following amended paragraph:

[0024] Fig. 2 is a ~~representation, likewise simplified, that shows~~ schematicdiagram showing a power distribution system comprising two batteries B1, B2 and three power distribution units or boxes, situated in different areas, e.g. in the front portion FPDU, I the rear portion RPDU, and in the middle portion MPDU of an automotive vehicle. The first two ~~ones~~ include a first part that governs power loads and a second part intended for loads fed from the network at a lower voltage level, ~~whilst~~ while the third one is only provided for loads at the lower voltage level. Each one of the energy distribution boxes comprises a control microcontroller.

Kindly replace paragraph [0025] with the following amended paragraph:

[0025] Figure 1 shows an electric power distribution architecture at two voltage levels, comprising at least a first battery B1 (1) at a first 12V voltage level and a second battery B2 (2) at a second, higher 36V voltage level, both provided with an automatic disconnection device and intended for differentiated supply of electric power to respective network sectors provided with units for distributing power to the loads, which

units are schematized by a single PDU (3) unit or assembly, controlled by a corresponding microcontroller. As can be seen, said first battery B1 (1) and sector or sectors it supplies can be fed in turn from the second battery B2 (2) through a converter DC/DC (4), ~~whilst~~ further the second battery B2 (2) and network at a higher voltage level are connected to a voltage generator G (5), such as e.g. an automobile's alternator.

Kindly replace paragraph [0026] with the following amended paragraph:

[0026] According to the invention, said first, lower-voltage-level battery B1 (1) has an associated module SMM microcontroller (6) ~~associated to it, based on a microcontroller-applied to~~ for monitoring the voltage and current (essentially, the direction of the current) at the posts of ~~this~~ said battery B1 (1) and to permanently ~~sensing~~ sense a state of operation of the converter DC/DC (4). ~~On the other hand,~~ Said ~~monitoring~~ module SMM microcontroller (6) of battery B1 (1) in turn is connected, through a port ~~of its micro-controller~~ and a communications network N (7) to each one of the control microcontrollers (10a, 20a, 30a) of the power distribution units (10, 20, 30) to the loads (12, 22, 32) in order to, facing a short-circuit situation sensed by said ~~monitoring~~ module SMM microcontroller (6) based on some sensed, predetermined values of voltage, current, and state of the converter DC/DC (4), inform ~~to~~ each one of the microcontrollers (10a, 20a, 30a) of said power distribution units (10, 20, 30) so that they perform a short-circuit protection process.

Kindly replace paragraph [0027] with the following amended paragraph:

[0027] Input arrows to module SMM microcontroller (6) indicate information that it permanently monitors for: state of the converter DC/DC (4), voltage at posts of battery B1 (1), and eventual load current to said battery B1 (1) at a lower voltage level. On the other hand, communications network N (7), depicted by dashed lines, indicates intercommunication between said module SMM microcontroller (6) and converter DC/DC (4), batteries B1 (1), B2 (2), and power distribution units PDU (3). Output arrows from module SMM microcontroller (6) indicate information and/or commands that said

module SMM microcontroller (6) sends to the microcontrollers (10a, 20a, 30a) in charge of the PDUs (3), as well as the eventual disconnection commands to batteries B2 (2) and ~~even~~ B1 (1).

Kindly replace paragraph [0028] with the following amended paragraph:

[0028] Said short-circuit protection process comprises several action alternatives to be performed on the part of the power distribution units (10, 20, 30) once module SMM microcontroller (6) has sent an interruption ot the microcontroller (10a, 20a, 30a) of the corresponding power distribution unit (10, 20, 30), basically consisting in a disconnection fo the charges and/or check/inspection thereof, after execution of which, and if the short-circuit situation persists, said module SMM microcontroller (6) may order the disconnection of battery B1 (1) and/or ~~even~~ of battery B2 (2).

Kindly replace paragraph [0030] with the following amended paragraph:

[0030] Thus, the first battery B1 (1) at a first 12V voltage level and the second battery B2 (2) at a second 36V voltage level are shown in Fig. 2. In this example, both batteries B1 (1) and B2 (2) are provided with a corresponding automatic disconnection device SDB (8); a monitoring module (9) of the state of charge SOC and of the state of health SOH, and a control node CN (40). Each battery B1 (1), B2 (2) is intended for a differentiated supply of electric power to respective network sectors provided wit power distribution units 10, 20, 30 to the loads. First battery B1 (1) and sector or sectors it feeds, is susceptible of being fed in turn frm second battery B2 (2) through a converter DC/DC (4) ~~whilst~~ further battery B2 (2) is connected to a voltage generator G (5), such as the vehicle's alternator. Control node CN (40) associated to battery B1 (1) takes on, in Fig. 2, the functions of said Module SMM microcontroller (6) applied to sensing the operative state of said converter DC/DC (4) and to subsequent monitoring in case said state is a stoppage of the conversion process of the voltage and current at the posts of said battery B1 (1).

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Kindly replace paragraph [0031] with the following amended paragraph:

[0031] Each power distribution unit 10, 20, 30 is controlled by a corresponding microcontroller 10a, 20a, 30a. In the illustrated example, distribution unit 10 has just one sector MPDU (41) dedicated to the loads situated in the middle portion of an automotive vehicle, which are at ~~14~~ 12V and have been symbolized as a lamp 12 protected by a fuse 11. Instead, distribution units 20 and 30, which are respectively intended for the loads in the front and rear portions of the automobile, have each ~~one~~ a respective sector of FPDU (42), RPDU (43) provided for feeding the loads at ~~14~~ 12V, symbolized by lamps 22, 32 protected by respective fuses 21, 31, and a respective sector of FPDU (42) and RPDU (43) for feeding loads 23, 33 at ~~42~~ 36V which have associated corresponding power switches 23a, 33a for controlling said loads, such as either FET power switches with current sensing or power relays.

Kindly replace paragraph [0032] with the following amended paragraph:

[0032] Communications of control node CN (40) of battery B1 (1), representative of short-circuit monitoring module within module SMM microcontroller (6), with node CN (40) of second battery B2 (2) and with the different microcontrollers 10a, 20a, 30a of the power distribution units 10, 20, 30 are preferably carried out through a dedicated network N (7), although a shared bus, such as a CAN bus, may be likewise used.

Kindly replace paragraph [0033] with the following amended paragraph:

[0033] The method according to the invention ~~basically~~ comprises performing a permanent monitoring of the state of converter DC/DC (4) that interrelates said two batteries B1 (1) and B2 (2), as well as at least the voltage and/or current at the posts of said battery B1 (1). In case of sensing a stoppage of the conversion process of the converter DC/DC (4), and after this, it occurs that said voltage value exceeds a certain threshold, and that said current is an input current to battery B1 (1), node CN (40) informs immediately through said dedicated communications network N (7) or CAN bus

to each one of the microcontrollers 10a, 20a, 30a of said power distribution units 10, 20, 30 so that they perform a short-circuit protection process.

Kindly replace paragraph [0034] with the following amended paragraph:

[0034] Thus, the method's initial step comprises proceeding, in an ordered and sequential manner, in the sensing of the condition of the converter DC/DC (4), acquiring the voltage at the posts of the 12V battery B1 (1) and, finally, sensing a possible load current of said battery B1 (1) and, only if the predetermined values of said two voltage and current measurements (in this last case, ~~basically~~ sensing an input or load current of battery B1 (1) fall within some pre-set ranges, proceeding to inform the power distribution units of an eventual short-circuit situation by sending an interruption to the corresponding microcontrollers 10a, 20a 30a so as to initiate a short-circuit protection algorithmorprocess.

Kindly replace paragraph [0035] with the following amended paragraph:

[0035] According to a first variant, a short-circuit protection process to be carried out by the power distribution units, essentially those 20, 30 which have associated power loads 23, 33, when their microcontrollers 20a, 30a receive said interruption, comprises a total disconnection of all said power loads 23, 33 and, in case a short-circuit situation continues being sensed (by assessment of three previously mentioned conditions) from said monitoring module SMM microcontroller ~~or~~ node CN (40) of battery B1 (1), sending a signal through said communications network N (7) for disconnection of at least the battery B2 (2) of higher voltage level (36V) is proceeded with, accessing the disconnection device SDB (8) of said battery B2 (2) or the module SMM microcontroller ~~of the~~ control node CN (40) associated with said battery B2 (2).

Kindly replace paragraph [0038] with the following amended paragraph:

[0038] The short-circuit protection process of the present invention comprises, according to another ~~variant~~ embodiment, progressively disconnecting all power loads 23, 33

associated to each one of the power distribution units 20, 30, and checking from said monitoring module SMM microcontroller ~~or~~ node CN (40) of battery B1 (1) if a certain disconnection makes the short-circuit situation stop. If that is the case, disconnection of the involved load is proceeded with. If at completion of the disconnection of all the power loads 23, 33 of each power distribution unit 20, 30 a short-circuit situation continues being sensed from said node CN (40) of the ~~monitoring~~ module SMM microcontroller, a signal for disconnecting at least higher-voltage-level battery B2 (2) is sent through said communications network N (7), accessing in order to doing so disconnection device SBD (8) of said battery B2 (2) or the module SMM microcontroller containing ~~of a~~ control node CN (40) associated with said battery B2 (2).

Kindly replace paragraph [0039] with the following amended paragraph:

[0039] Still another ~~different possibility~~ embodiment for the short-circuit protection process fo the present invention comprises supervising current demand of some controlling devices, such as a power switch 32a, 33a, associated to each one of the power charges 23, 33 dependent on each one of the power distribution units 20, 30, and disconnecting those loads in which said demand exceeds a certain threshold and, then, in case a short-circuit situation continues being sensed ~~from said monitoring module~~, after completion of the supervision of all the power loads of each power distribution unit, a signal for disconnecting at least higher-voltage-level battery B2 (2) is sent through said communications network N (7), accessing ~~in order to doing so~~ the disconnection device SDB (8) of said battery B2 (2) or the module SMM microcontroller of a control node CN (40) associated with said battery B2 (2).

Kindly replace paragraph [0041] with the following amended paragraph:

[0041] As indicated, whichever ~~the action variant~~ embodimentis chosen, if after the execution of said short-circuit protection process by each one of said power distribution units 20, 30 in relation with the power loads 23, 33 involved, node CN (40) of the ~~monitoring~~ module SMM microcontroller associated with battery B1 (1) continues

sensing a short-circuit situation, disconnection of battery B2 (2) or even battery B1 (1) from their corresponding sectors of the network they feed is ~~proceeded with~~ undertaken.

Kindly replace paragraph [0042] with the following amended paragraph:

[0042] As for the latency (time period from sensing until solving a short-circuit event) of the proposed action the different steps of the method have to be considered: 1) sensing: information about a state of stoppage of the converter DC/DC (4), together with the acquisition of the voltage and current values at the posts of battery B1 (1), can take less than 2 ms, and generating, from the module SMM microcontroller ~~of the~~ node CN (40) of said battery B1 (1), an interruption to the microcontrollers 10a, 20a, 30a of the power distribution units can last approximately 500 μs. Therefore, time of sensing may be close to 2.5 ms; 2) execution of an algorithm of sensing of the load involved or causing the short-circuit situation, by each one of the power distribution units or boxes 10a, 20a, 30a, basically depends on the programming of the interruption in the respective microcontroller 10a, 20a, 30a and on the circuits of the FET devices 23a, 33a with current sensing, being able to estimate it between 250 μs and 500 μs (depending on the FET power transistor used.)